

### **REMARKS**

Applicants appreciate the review of the present application as evidenced by the Official Action. In light of the amendment of independent Claim 11 and the subsequent remarks, Applicants respectfully submit that the rejection of claims 1-7 and 11-17 under 35 USC § 101 as being directed to non-statutory subject matter is overcome. Additionally, in light of the amendments to independent claims 1, 8 and 11 and the subsequent remarks, Applicants respectfully submit that the rejection of claims 1-17 under 35 USC § 102(b) as being anticipated by U.S. Patent No. 5,652,867 to Barlow et al. is overcome and request reconsideration and allowance of the present application.

#### ***A. The Rejection of Claims 1-7 and 11-17 under 35 U.S.C. § 101 is Overcome***

The Official Action rejected claims 1-7 and 11-17 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. As described below, however, the method and computer program product for optimizing a schedule of legs employed in transporting objects between geographic markets of the claimed invention are within the technological arts and produce a useful, concrete and tangible result, such that the method and computer program are directed to statutory subject matter.

Patentable subject matter is defined by 35 U.S.C. §101. "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title." The Federal Circuit has interpreted 35 U.S.C. §101 as requiring an invention to fall into one of the process, machine, manufacture or composition of matter categories. "The plain and unambiguous meaning of §101 is that any invention falling within one of the four stated categories of statutory subject matter may be patented, provided it meets the other requirements for patentability set forth in Title 35, i.e., those found in §§ 102, 103 and 112, ¶12." See *State Street Bank & Trust Co. v. Signature Financial*, 149 F.3d 1368, 1372 (Fed. Cir. 1998).

Also in *State Street Bank*, the Federal Circuit described three categories of nonpatentable subject matter namely, laws of nature, natural phenomena, and abstract ideas. *See, id.* at 1373. With respect to abstract ideas, the Federal Circuit reaffirmed that mere mathematical algorithms devoid of some “useful, concrete and tangible result” are specifically not patentable. *See, id.* The Manual of Patent Examining Procedure (“MPEP”) reflects the Federal Circuit’s decision by stating that the “purpose of this requirement is to limit patent protection that have a level of ‘real world’ value, as opposed to nothing more than an idea or concept.” *See*, MPEP §2106 II. A. In addition, the MPEP proffers a stringent requirement for asserting a lack of utility under §101. “Office personnel have the burden to establish a *prima facie* case that the claimed invention as whole is **directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result**. Only when the claim is **devoid of any limitation to a practical application in the technological arts** should it be rejected under 35 U.S.C. 101,” (emphasis added). *See, id.*

Regarding independent claim 1, as a basis for the rejection under 35 U.S.C. §101 it was alleged in the Office Action that although the method of claim 1 produces a useful, concrete and tangible result, claim 1 only recites an abstract idea and therefore is not within the technological arts and not statutory subject matter. As stated in the Official Action, “The recited steps of merely determining a set of itineraries does not apply, involve, use or advance the technological arts since all of the recited steps can be performed in the mind of the user or by use of a pencil and paper.” *See* bottom of page 2 to top of page 3. The Official Action also stated that, “The deficiencies in the present claim may be overcome by simply expressly stating in the body of the claims the use of technology such as a *computer* processor and/or a *computer* database.” *See* page 3, second full paragraph.

Applicants respectfully disagree that independent claim 1 of the present application recites only an abstract idea and therefore is not within the technological arts. Applicants are not aware of any statutory, case law, or other authority that requires business method claims to include the description of specific computer components. In fact, the Federal Circuit has expressly held that business methods are patentable, overturning the previously-existing business method exception. “We take this opportunity to lay this ill-conceived exception to rest. Since its

inception, the ‘business method’ exception has merely represented the application of some general, but no longer applicable legal principle.” *See id.* at 1375. Applicants could not find any mention in *State Street Bank* conditioning the patentability of business method inventions on the use of specific computer components.

As a result, the “technological arts” are not limited to the use of computers and can involve various business aspects. Therefore, there is no requirement that the claims must include language that describes the use of computer systems, communication systems, software or databases. The mere fact that the method of independent claim 1 recites some business-oriented aspects does not push the method out of the boundaries of patentable subject matter, nor does it require description of specific computer components.

Additionally, the preamble of independent claim 1 recites that the method is computer implemented. The Official Action discounts this recitation by concluding that the computer implementation merely goes to the field of use and does not necessarily position the claimed invention within the technological arts. Applicants submit, however, that a proper reading of the recitation in the preamble that the method is “computer implemented” would require that at least one of the steps of the method of Claim 1 be implemented or performed by a computer, thereby satisfying even the overly stringent test employed by the Official Action to determine if a claimed invention is within the technological arts.

In summary, independent claim 1 and all of the claims that depend therefrom, namely claims 2-7, recite a method that has a useful, concrete and tangible result, and, since the method of Claim 1 is described to be “computer implemented” and further since we are not aware of any current law that requires claims describing business aspects to also describe specific computer hardware components, claims 1-7 also are within the technological arts. Therefore, the rejection under 35 U.S.C. §101 of independent claim 1 and, therefore, dependent claims 2-7, has been overcome.

Regarding independent claim 11, as a basis for the rejection under 35 U.S.C. §101 it was alleged in the Office Action that data structures not embodied on a computer readable media are considered descriptive material, which are therefore considered non-statutory because they are not capable of causing a functional change in a computer. The Official Action also states that

independent claim 11 fails to have a tangible result because it “merely recites non-functional descriptive material, as no recitation of executable code being embodied on any medium or data structure is provided.” See page 4, third full paragraph. Independent claim 11 has now been amended to recited that the computer program product includes computer readable instructions embodied in a computer readable medium, as suggested by the Official Action. As such, the computer program product can no longer be properly considered descriptive matter, but, instead, defines statutory subject matter. Accordingly, the rejection of Claim 11, as well as Claims 12-17 that depend therefrom, under U.S.C. § 101 is therefore overcome.

Applicants also note that as much as the claims at issue in *State Street*, claims 11-17 recite a computer program product that produces a “useful, concrete and tangible result.” In *State Street*, the claims at issue were drawn to a system for permitting an administrator to monitor and record the flow of financial information and make all necessary calculations for maintaining a partner fund financial services configuration. 149 F.3d at 1371. In holding that the claimed system at issue in *State Street* was patentable subject matter, the court stated, “the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula or calculation, because it produces ‘a useful, concrete and tangible result’ – a final share price momentarily fixed for recording and reporting purposes ....” *Id.* at 1373.

Similar to the claimed subject matter at issue in *State Street*, the computer program product of claims 11-17 transform data by determining the profitability of each market plan. The profitability then may be used in selecting from the set of market plans a subset optimizing overall profit of the schedule and then evaluating the selected subset of market plans. As such, the profitability of each market plan can be considered to be a “useful, concrete and tangible result” of the claimed computer program product.

***B. The Rejection of Claims 1-17 under 35 U.S.C. § 102(b) is Overcome***

The Official Action rejected claims 1-17 under 35 USC § 102(b) as being anticipated by U.S. Patent No. 5,652,867 to Barlow et al. As described below, however, the method, system and

computer program product of the claimed invention for optimizing a schedule of legs employed in transporting objects between geographic markets are not taught or suggested by the Barlow '867 patent.

The Barlow '867 patent discloses a computerized airline reservation system simulator that can be used by an airline to maximize revenues. See Col. 3, lines 37-39. As shown in Figure 1, a global network is built (step 4) using the host airline and other airline information 2, which includes origin and destination information for flight services offered by the airline provider, display rules for each CRS, market share information, estimates of market size and revenues, frequency of requests for each request time, and the host airlines' share of bookings on a given CRS. The global network 4 is a worldwide database arrangement of travel services provided by travel providers in all markets of interest. See Col. 3, lines 46-59. A CRS display screen is then simulated (step 6) and analyzed to determine the screen presence of the travel provider's flight services on the network of reservation systems, which also takes into account the market size and revenue of the travel provider's services in a given market (step 8). The results are provided to the user (step 10). The host airline information may be modified and the process repeated to provide updated results in step 10. See Col. 3, line 66 to Col. 4, line 19.

As shown in Figure 2 of the Barlow '867 patent, to build the global network, an origin-destination record containing all origin-destination data, including connecting points, for all flight services offered by airline travel providers in all markets of interest is built (step 16). Any unattractive service options then may be eliminated from the origin-destination record whenever a superior service is available (step 18). Given a particular flight service request, select options are executed to identify the potential flight services for sorting and display (step 20). See Col. 4, lines 20-45.

As shown in Figure 3 of the Barlow '867 patent, the screen simulation step determines what type of CRS to emulate and obtains the sort and display rules (step 23) for the CRS. Consumer service requests to show travel agent request activity on a CRS are also simulated (step 31). Simulation screens for individual markets and request times are created (step 34), which represent the display information obtained when service requests 31, 32 and 33 are made

for the travel provider's flight services in all markets of interest throughout the global network. See Col. 4, line 46 to Col. 5, line 22.

As shown in Figure 5 of the Barlow '867 patent, the analysis begins by recreating the simulation screens created in step 34 (step 48). The information in the simulated screens is summarized to determine the airline provider's screen presence in all markets (step 50) and per individual market (step 52), which allows the determination of average screen presence throughout all markets (step 54). The screen presence of flight services on a given CRS is also calculated using the reservation system's build, edit, sort and display rules (step 56). The travel provider's revenue potential in a given market, overall market or combination of markets is also determined (step 58). See Col. 5, line 48 to Col. 6, line 3. The revenue potential is derived from market share parameters, such as market size and market revenues so as to quantify the travel provider's revenue potential if no passengers were turned away and no limits in capacity existed. See Col. 6, lines 42-46.

Thus, the Barlow '867 patent provides a CRS simulator that evaluates the screen presence of a carrier's scheduled flights on a connection-by-connection basis. The air carrier can maximize revenues for a given flight based on the best screen presence for each connecting point of the flight, then schedule a flight service comprising the most desired connecting points as requested by customers and thereby maximize its overall revenues along the entire flight path. See Col. 2, lines 39-47.

In contrast to the disclosure of the Barlow '867 patent, the computer implemented method, system and computer program product for optimizing a schedule of legs employed by at least one service provider in transporting objects between geographic markets of the claimed invention identify a set of itineraries for serving each market in a set of markets, each itinerary comprising one or more legs. The computer implemented method, system and computer program product of the claimed invention also generate a set of market plans for each of a plurality of markets. As now recited by the amended independent claims, the set of market plans for each market comprises a plurality of market plans with each market plan including a modified set of the itineraries for the market. The profitability of each market plan is then individually determined for each market following the generation of the set of market plans for

each of the plurality of markets. Finally a subset optimizing overall profit of the schedule is selected from the set of market plans for each market while also taking into account the resources of a service provider. As now recited by the amended independent claims, this subset selection is conducted following a determination of the profitability of each market plan for each market.

As stated on page 6, lines 8-9 of the specification, a market plan is an automatically-generated list of itineraries for serving a city-pair called a market. By way of example, the method, system and computer program product of amended independent claims 1, 8 and 11 initially identify the set of itineraries currently serving each market. In the case of the airline industry, the method, system and computer program product would initially identify the scheduled flights serving each market, wherein the market is defined as an origin and destination pair. The method, system and computer program product would then generate a set of modified itineraries for each of a plurality of markets. By way of example, for a market defined by an origin of Dallas-Fort Worth (DFW) and a destination of Seattle, the original set of itineraries that was identified might include a single direct flight from DFW to Seattle. As such, the set of market plans generated for the DFW to Seattle market could then include other direct flights between DFW and Seattle at different times than the currently scheduled flight, as well as connecting flights, such as an itinerary that includes a flight from DFW to San Francisco and subsequently a flight from San Francisco to Seattle and another itinerary including a flight from DFW to Denver and a subsequent flight from Denver to Seattle.

As now recited by amended independent claims 1, 8 and 11, a plurality of market plans are generated for each of a plurality of markets. Thereafter, the profitability of each market plan is individually determined for each of the markets. Thus, the profitability of the currently scheduled itineraries as well as the profitability of each of the hypothetical markets plans that have been generated are determined. Continuing with the prior example, the profitability of the currently scheduled flight from DFW to Seattle is determined, as well as the individual profitability of each of the alternative itineraries, such as each of the direct flights from DFW to Seattle at different times as well as the connecting flights through San Francisco and Denver. As now recited by amended independent claims 1, 8 and 11, this individual determination of the profitability of each market plan is conducted for each market plan in each market following the

generation of the set of market plans for each of the plurality of markets. In other words, the plurality of market plans for each of a plurality of markets are generated and then the profitability of each market plan in each market is individually determined.

Thereafter, a subset of markets plans is selected from among the set of market plans for each market that optimizes the overall profit of the schedule. By way of the continued example, this selection process can analyze the various markets plans, i.e., flight options, and the profitability of each market plan within each market and select zero, one or more market plans for each market, wherein the selected market plan(s) in combination with the market plans selected for the other markets optimize the overall profit of the schedule. For example, this selection process may determine that the overall profit of the schedule is optimized by supplementing the currently scheduled direct flight between DFW and Seattle with a connecting flight through San Francisco, but not by offering other direct flights between DFW and Seattle at other times and not by offering another connecting flight through Denver.

As now further recited by amended independent claims 1, 8 and 11, the selection of the subset that optimizes the overall profit of the schedule also accounts for the resources of the service providers that provide the various legs, such as the various flights. By way of example, the selection of the subset that optimizes the overall profit of the schedule takes into account the finite resources of the service providers and does not select a subset that optimizes the overall profit of the schedule but that requires more resources than possessed by the service provider. In the foregoing example, the subset optimizing the overall profit of the schedule would be selected in such a manner that no aircraft would be required to be in two places at any one time or to be in service in conjunction with two or more flights at one time. As is now also recited by amended independent claims 1, 8 and 11, the selection of the subset optimizing the overall profit of the schedule is conducted following the determination of the profitability of each market plan for each market.

By individually determining the profitability of each market plan for each market following the generation of the set of market plans for each of plurality of markets, and by thereafter selecting the subset optimizing the overall profitability schedule following the determination of profitability of each market plan for each market, the method, system and

computer program product of the claimed invention can more efficiently analyze a wide variety of alternative schedules and arrive at an optimized schedule in terms of profitability, as opposed to more conventional incremental approaches in which a scheduled change was made and the effect of the schedule change on profitability was evaluated, prior to considering any other scheduling changes and their respective effects upon profitability.

More particularly, the Barlow '867 patent does not teach or suggest generating a plurality of market plans for each of a plurality of markets and then subsequently individually determining the profitability of each market plan for each market, as now recited by amended independent claims 1, 8 and 11. Instead, the Barlow '867 patent describes the generation of a single modified market plan for each market. While each modified market plan may include multiple modifications relative to the current flight schedule, only a single modified market plan is generated for each market at any one time. Based upon the computerized airline reservation system simulation of the Barlow '867 patent, the screen presence per individual market is calculated and, in turn, the average screen presence throughout all markets is determined. Based upon this average screen presence, the revenue potential attributable to the modified market plan in each market can be determined. In contrast to the claimed invention, if the technique described by the Barlow '867 patent desires to consider the impact of other modified market plans upon the profitability of the schedule, the entire process would be repeated.

By way of example, the Barlow '867 patent would suggest the generation of a first modified market plan for each market and the subsequent determination of the overall profit of the modified schedule, followed by the generation of the second modified market plan for each market followed by the determination of the revenue potential of the second modified market plan. Conversely, the method, system and computer program product of the claimed invention now recites the generation of the first, second and any other market plans for each market, the determination of the profitability of each market plan following the generation of all of the market plans for each market and then the selection of the subset of market plans that optimize the overall profit of the schedule following the determination of the profitability of each market plan for each market.

The Barlow '867 patent also fails to teach or suggest selecting from the set of market plans for each market the subset optimizing the overall profit of the schedule following the determination of the profitability of each market plan for each market. Instead, as described above, the Barlow '867 patent would consider the revenue potential of a schedule comprised of a modified market plan for each market, but does not describe selecting from among a set of market plans that have been generated for each market and for which the profitability has been individually determined, as now recited by the claimed invention. Instead, to consider the impact of additional modified market plans upon the revenue potential, the overall process would be repeated in accordance with the technique described by the Barlow '867 patent, thereby potentially resulting in a somewhat less efficient process than that recited by the present invention.

Moreover, the Barlow '867 patent does not teach or suggest selecting a subset of market plans from among the set of market plans that has been generated for each market to optimize overall profit schedule "while accounting for resources of a service provider", as now recited by the amended independent claims. In this regard, the method, system and computer program product of amended independent claims 1, 8 and 11, respectively, insure that the service providers have appropriate resources to perform the subset of market plans that is selected to optimize the overall profit of the schedule, such as by having a sufficient number of aircraft in the appropriate locations to fly the modified schedule. In contrast, the Barlow '867 patent does not teach or suggest any consideration of the resources of a service provider, as now recited by claimed invention.

For at least the foregoing reasons, independent claims 1, 8 and 11 as amended, are not taught or suggested by the Barlow '867 patent. Since the claims that depend therefrom include each of the recitations of a respective independent claim, the dependent claims are likewise not taught or suggested by the Barlow '867 patent. However, several of the claims include additional recitations that further patentably distinguish claimed invention from the Barlow '867 patent. By way of example, amended independent Claim 8 as well as dependent Claim 5 and 15 recite the use of a mixed integer problem to select from the set of market plans for each market a subset optimizing the overall profit of the schedule while accounting for the resources of a

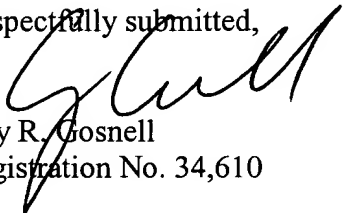
service provider. In contrast, the Barlow '867 patent does not teach or suggest the use of any type of mixed integer problem as recited by the claims 5, 8 and 15 and, by dependency, claims 9 and 10. As such, these claims are also not taught or suggested by the Barlow '867 patent for this additional reason.

### CONCLUSION

In view of the amendments and the remarks presented above, it is respectfully submitted that all of the present claims of the present application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

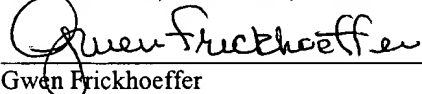
Respectfully submitted,

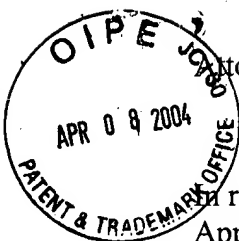
  
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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on April 5, 2004.

  
Gwen Frickhoeffter



Attorney's Docket No. 023895/258395

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Dirk P. Gunther, et al. Confirmation No.: 2936  
Application No.: 09/658,866 Group No.: 3626  
Filed: September 8, 2000 Examiner: Rachel L. Porter  
For: METHOD AND SYSTEM FOR DEVELOPING OPTIMIZED SCHEDULES

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
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PETITION AND FEE FOR EXTENSION OF TIME 37 C.F.R. § 1.136(a)

1. This is a petition for an extension of time for a total period of three (3) months to respond to the Office Action dated October 3, 2003.

2. Applicant is ☐ a small entity; ☒ other than a small entity.

3. Calculation of extension fee (37 C.F.R. § 1.17(a)(1)-(a)(5)):

Total Months Requested	Fee For Other Than Small Entity	Fee for Small Entity
<input type="checkbox"/> one month	\$110.00	\$55.00
<input type="checkbox"/> two months	\$420.00	\$210.00
<input checked="" type="checkbox"/> three months	\$950.00	\$475.00
<input type="checkbox"/> four months	\$1,480.00	\$740.00
<input type="checkbox"/> five months*	\$2,010.00	\$1,005.00

\*Cannot be used to exceed six-month statutory limit for response to an Official Action.

☒ A check in the amount of \$950.00 is enclosed.

☐ Charge Deposit Account No. 16-0605 for the extension fee.

☒ Charge Deposit Account No. 16-0605 for any fee deficiency.

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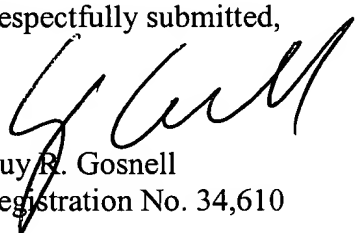
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